

*Research Article***Endoscopic Septoplasty: Technique and Benefits**

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**Abstract**

Nasal obstruction is the most common complaint in rhinologic practice and a deviated nasal septum is the most common cause of nasal obstruction. Apart from nasal obstruction, a significantly deviated nasal septum has been implicated in epistaxis, sinusitis, hyposmia and headache. The advent of new technologies, in particular nasal endoscopy, has made it possible to address septal pathologies in a more directed and precise fashion. The aim of this study was to determine the value of endoscopic septoplasty in comparison with traditional septoplasty. The study was on two groups group A included 30 patients treated by endoscopic septoplasty, group B included also 30 patients and treated by traditional septoplasty. In our study, as compared to traditional septoplasty, post-operative percentage benefits were better in case of endoscopic septoplasty considering all parameters i.e nasal obstruction, headache, nasal discharge, bleeding per nose and hyposmia. In addition, the incidence of post-operative complications was comparatively less in case of endoscopic septoplasty especially residual deviation which was found to be significantly higher in traditional septoplasty. Thus endoscopic septoplasty may be considered as a better procedure for surgical correction of deviated nasal septum.

**Key words:** endoscopic septoplasty , deviated septum ,traditional septoplasty.

**Introduction**

Septoplasty has been traditionally performed under direct visualization with headlight illumination. Freer and Killian each described their mucosal-sparing techniques at the turn of the twentieth century, and these techniques remained largely unchanged through the century.<sup>(1&2)</sup>

The advent of new technologies, in particular nasal endoscopy, has made it possible to address septal pathologies in a more directed and precise fashion. Endoscopy enables the surgeon to localize the spurs and remove them under direct visualization by performing an incision precisely over the spur, thus minimizing surgical trauma. Also enables management of other pathologies in the nasal cavity. Visualization with the endoscope also allows for better diagnosis of posterior septal deformities and difficult deviations in the instance of revision cases. In fact, an incision localized to the site of the spur avoids excessive scarring secondary to mucosal trauma because minimal

submucosal dissection and cartilage resection are performed.<sup>(3)</sup>

Additionally, the endoscopic approach makes it possible for many people to simultaneously observe the procedure on a monitor, making the approach useful in a teaching setting. Nasal endoscopy is an excellent tool for outpatient surveillance following septoplasty during the initial postoperative healing period and beyond.<sup>(4)</sup>

One consideration or relative contraindication for using the endoscopic technique is a caudally located septal deformity. In such cases the telescope does not afford a significant benefit until flap dissection is carried more posteriorly.<sup>(5)</sup>

The aim of this study was to determine the value of endoscopic septoplasty in comparison with traditional septoplasty.

**Patients and Methods**

This study was carried out at the department of ENT Minia university

hospital, in the period from May 2014 to December 2016. The study included 70 patients who were arranged in two groups A and B. The main nasal pathology was the symptomatic deviated septum, for which septoplasty was the only surgical procedure. Group A included 30 patients treated by endoscopic septoplasty, group B included also 30 patients and treated by traditional septoplasty.

#### **Inclusion criteria:**

Patients with symptomatic deviated nasal septum especially refractory to conservative medical treatment with a long history of nasal obstruction, nasal discharge, hyposmia, post nasal drip and/or facial pain or headache were included .

#### **Exclusion criteria**

Patients who were unfit for surgery or general anesthesia or with recent upper respiratory tract infection and patients with caudal dislocation were excluded.

Ethical clearance was obtained and informed written consent was taken from each patient. The patient's information was collected which included patient's name, age, sex, occupation, present history and past history.

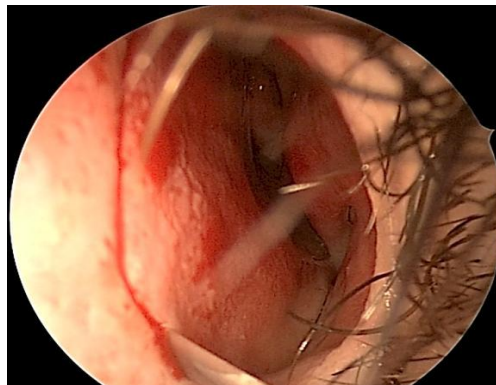
All patients underwent a full ENT examination with a preoperative diagnostic nasal endoscopy. With the nasal endoscopy we noted the type, severity and site of the septal deviation, and whether in the cartilaginous or bony area.

A preoperative computed tomographic (CT) scan of the nose and paranasal sinuses (coronal and axial cuts) was carried out to exclude any paranasal sinuses pathologies.

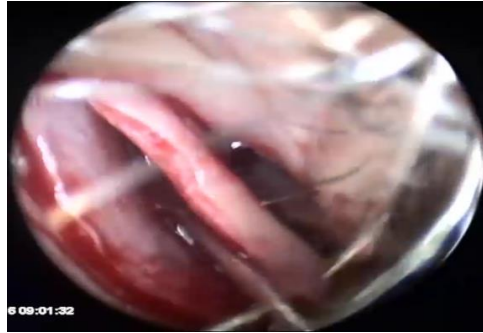
#### **Surgical technique:**

All cases were performed under general anesthesia. The technique for endoscopic septoplasty included position of the patient, preparation and draping for septoplasty. Under endoscopic visualization with a 0 degree 4 mm endoscope, the following steps were performed; local oxymetazoline was applied for decongestion; 2% lidocaine with 1:100,000 epinephrine was injected subperichondrially along the septum. Hemitransfixation was made using #10 scalpel.

The incision was not be extended from dorsum to the floor as in classical incision but extended both superiorly and inferiorly just as needed to expose the most deviated part. Mucoperichondrial flap elevation was performed with a cottle elevator (or Suction freer) under direct endoscopic visualization with a 0 degree endoscope. A suction elevator may be used as an alternative dissecting instrument to simultaneously clear any blood from the field of view during flap elevation. Underlying bone was exposed and the most deviated part was removed with the small Luc's forceps. Adequacy of the surgical correction was assessed by returning the mucosal flaps to the midline and inspecting the nasal airway bilaterally while palpating areas of residual deviation. Once satisfactory correction was achieved, the flap was repositioned back after suction of blood and edges of the incision was made to lie closely, returned to their anatomic positions. Quilting sutures were used to hold them in place. Then packing of the nasal cavity with Merocel pack was performed.<sup>(1)</sup> fig. 1,2.



**Fig. 1. Hemitransfixation incision**



**Fig. (2): Elevating the mucoperichondrial flap was performed using the suction elevator.**

Traditional septoplasty as performed for group B patients. The traditional approach involved headlight illumination and using

the nasal speculum for visualization. Nearly the same instruments as those for endoscopic septoplasty were used .fig.3.



**Fig. (3): Traditional septoplasty**

**Results**

Most of the patients diagnosed with DNS in our study were in the age group of 21-30 years (30.18%) followed by 31-40 years (23.45%) with 01.7% being females and

48.3% being males. Pre-operative endoscopic examination of the patients of both groups as regard of the type of septal deviations table 1.

**Table 1: Frequency (by type) of septal deviation.**

Type	Number of cases	Frequency (percentage)
C shape	20	41.7%
S shape	21	30%
Septal spur	10	16.7%
More than one type	4	6.7%

Intraoperatively, 40% patients had evidence of a bony deviation, and 30% patients had a cartilaginous deviation with 30% having both bony and cartilaginous deviations.

The mean intra-operative time taken during endoscopic septoplasty was 33.38±0.32 min. During traditional septoplasty, the mean intra-operative time was slightly more being 30.7±4.77min.

Patient of traditional septoplasty group present with intraoperative mucosal tear in 1 patients (26.7%), while endoscopic septoplasty group presented with intra-operative mucosal tear in one patient (3.3%) Statistically significant difference was observed between two groups ( $p > 0.05$ )

Of the total 30 cases diagnosed with DNS, the most common presenting symptom was nasal obstruction being present in all cases

followed by nasal discharge (post-nasal drip) (46.7%), headache (46.7%), epistaxis (20%). hyposmia was detected in 10% of cases.

Table 2 shows the post-operative subjective evaluation of the frequency of symptoms relieved after surgery among our patients. There was a significant relief in nasal obstruction in cases treated by endoscopic septoplasty.

**Table (2): Comparison of the degree of improvement of symptoms between endoscopic septoplasty group versus traditional septoplasty group.**

Parameter	Group (endoscopic septoplasty)			Group B(traditional septoplasty)			P value
	Preoperative no of patients	Postoperative no of patients	Improvement in %	Preoperative no of patients	Postoperative no of patients	Improvement in %	
Nasal obstruction	30	3	90%	30	9	70%	0.02*
Nasal discharge	14	3	78.6%	14	3	78.6%	0.7
Headache	14	3	78.6%	14	7	50%	0.3
Epistaxis	6	0	100%	6	2	66.7%	0.05
Hyposmia	0	1	100%	4	2	50%	0.6

In group A percentage of relief from nasal obstruction was 90%. Headache and nasal discharge were relieved in 78.6% of cases and epistaxis was relieved in 100% of the cases, and 100% relief of hyposmia. The percentage of patients who were relieved of their symptoms in group B were 70% in case of nasal obstruction, 78.6% for nasal discharge and 50% for headache and hyposmia. Epistaxis was relieved in 66.7%

of the cases. The difference between the two operative procedures was statistically significant considering nasal obstruction.

Post operative evaluation was made by two methods, the first by postoperative percentage of symptoms relief, and the second by follow up endoscopic examination to detect any complications or residual (uncorrected) deviations.

**Table 3: Late post operative complications.**

Parameter	Group A (endoscopic septoplasty) =30 cases		Group B (traditional septoplasty) =30 cases		P-value
	No.	%	No.	%	
Complication					0.030
No	28	93.3	20	66.7	
Synechia	1	3.3	6	20	
Perforation	1	3.3	4	13.3	

There was no incidence of other complications, including changes in nasal shape ,hematoma , hemorrhage or dental pain. No major complications found in the immediate post-operative period.

**Table 4: Comparison of post-operative Uncorrected septal deviations of endoscopic septoplasty versus traditional septoplasty.**

Uncorrected septal deviations	Group A (endoscopic septoplasty) = 30 cases		Group B (traditional septoplasty) = 30 cases		p-value
	No.	%	No.	%	
No	29	96.7	20	66.7	.003*
Residual deviation	1	3.3	10	33.3	

\*significant

The residual deviation in group A was anterior maxillary crest deviation while in case of group B all the residual deviations were posterior deviations or spurs.

The incidence of residual deviation, synechae and septal perforation was 3.3%, in group A. Incidence of various post-operative complications in case of group B were 33.3% in case of residual deviation and 20% in case of synechae and 13.3% in case of septal perforation.

**Discussion**

Most of the patients diagnosed with DNS in our study were in the age group of 21-30 years (30.1%) followed by 31-40 years (23.5%) with 51.7% being females and 48.3% being males. These findings were not in concordance with a study by Sinha SN, Maheshwari VK.<sup>(9)</sup>

Majority of the patients presented with deviation to the left (43.3%), followed by 30% of the cases having deviation to the right and 26.7% of the patients had bilateral deviation. This was similar to the observation made by Daghistani KJ who reported that incidence of DNS was more the left side (50.6%).<sup>(6)</sup>

Of the total 30 cases diagnosed with DNS, the most common presenting symptom was nasal obstruction being present in all patients followed by nasal discharge (post-nasal drip) (46.7%), headache (46.7%), epistaxis (20%), hyposmia was detected in 10% of cases.

In a study by Iqbal SM et al, they found that majority of the patients presented with the nasal obstruction (90%) followed by the nasal discharge (20%) and headache (40%). Hyposmia was present in 6.4% of the patients<sup>(3)</sup>.

In the study by Low WK, Willat DJ symptom seen in patients were of snoring (57.3%), headache (48.0%), rhinorrhoea (38.7%), sneezing (30.7%), hyposmia (30.7%) and epistaxis (21.3%).<sup>(11)</sup>

In present study majority had a C deviation (43.3%). Among rest, 30% had S deviation. 16.7% had spurs and 6.7% combination of more than one type of DNS.

In study by Moorthy PNS, the incidence of type of nasal septal deviation was found to be as follows: C shaped deviation (40%), spur (20%), caudal deviation or dislocation (16%), and S shaped deviation (20%). The findings were not different from present study.<sup>(11)</sup>

The mean intra-operative time taken during endoscopic septoplasty was 33.3±0.32 min. During traditional septoplasty, the mean intra-operative time was slightly more being 30.7 ± 4.7 min. Soo Kweon Koo et al, in their study reported the intraoperative time during endoscopic septoplasty was 32.4±2.76 minutes.<sup>(11)</sup>

Paradis J, Rotenberg BW in their study comparing conventional versus endoscopic septoplasty found that operative time

( $p < 0.001$ ) significantly favoured the endoscopic group. However, no such significant difference was found in this study.<sup>(17)</sup>

In our study, the incidence of intra operative mucosal tear in cases of endoscopic septoplasty was 3.3% while that of the traditional group was 26.7%. Statistically significant difference was observed between two groups ( $p > 0.05$ ), and this explained the high incidence of septal perforations in traditional septoplasty group in comparison to endoscopic group.

Paradis and Rotenberg reported mucosal damage in 11 patients conventionally, versus 3 in the endoscopic group ( $p < 0.01$ ).

Sathyaki et al. reported twice as many cases of mucosal damage in conventional septoplasty group.<sup>(13,15,16)</sup>

In a series of 273 power-assisted endoscopic septoplasties, De Sousa et al. found a higher rate of success in preventing mucosal lacerations with endoscopic technique, resulting in a decreased risk of permanent perforation. The endoscopic dissection was found to be particularly useful in addressing septal spurs.<sup>(11)</sup>

Table 6 shows the comparison of percentage of symptom relief of traditional septoplasty in present study with various previous studies.

**Table 6: Comparison of percentage of symptom relief of traditional septoplasty in present study with various previous studies.**

	Gupta et al., <sup>17</sup>	Suligavi et al., <sup>18</sup>	Leena Jain et al., <sup>19</sup>	Sathyaki et al., <sup>13</sup>	Khan et al., <sup>11</sup>	Present study
Nasal obstruction	88%	80%	38%	88%	70%	70%
Nasal discharge	77%	90%	37%	100%	80%	77.7%
Headache	92%	80.7%	0%	80%	72%	0%
Epistaxis	-	-	-	100%	80%	77.7%
Hyposmia	-	77.7%	-	100%	0%	0%

Table 7 shows the comparison of percentage of symptom relief of endoscopic septoplasty in present study with various previous studies.

**Table 7: Comparison of percentage of symptom relief of endoscopic septoplasty in present study with various previous studies.**

	Gupta et al., <sup>17</sup>	Suligavi et al., <sup>18</sup>	Leena Jain et al., <sup>19</sup>	DC Sathyaki et al., <sup>13</sup>	MN Khan et al., <sup>11</sup>	Present study
Nasal obstruction	96%	96%	96%	96%	93.3%	90%
Nasal discharge	88%	100%	30%	100%	80.7%	77.7%
Headache	100%	94.4%	0%	100%	80.9%	77.7%
Epistaxis	-	-	-	-	100%	100%
Hyposmia	-	100%	10%	100%	87.0%	80%

In our study, as compared to traditional septoplasty, post-operative percentage benefits were better in case of endoscopic septoplasty considering all parameters i.e nasal obstruction, headache, nasal discharge, bleeding per nose and hyposmia.

The advantage of endoscopic septoplasty as a method of surgical management of DNS was found to be statistically significant ( $p$  value  $< 0.05$ ) considering nasal obstruction as parameter.

In the study by Jain L et al, similar statistically significant difference was found on comparison of conventional septoplasty and endoscopic septoplasty. In another study by Sulligavi et al, the difference was significant similar to our study.<sup>(19),(18)</sup>

Various studies were conducted by many authors to study the incidence of late post-operative complications of traditional septoplasty and endoscopic septoplasty. Table V & A show comparison of post-operative complications of traditional & endoscopic septoplasty in present study with various previous studies.

**Table V: Comparison of post-operative complications of traditional septoplasty in present study with various previous studies.**

complications	Chung et al., <sup>17</sup>	Suligavi et al., <sup>18</sup>	Leena jain et al., <sup>19</sup>	Chitradurga et al., <sup>21</sup>	DC Satyaki et al., <sup>14</sup>	MN Khan et al., <sup>11</sup>	Present study
Residual Deviation	2%	14%	36%	-	-	36.7%	33.3%
Synechae	1%	20%	20%	4%	16%	16.7%	20%
Septal Perforation	2%	-	-	0%	-	7.6%	13.3%

**Table A: Comparison of post-operative complications of endoscopic septoplasty in present study with various previous studies.**

complications	Chung et al., <sup>17</sup>	Suligavi et al., <sup>18</sup>	Leena jain et al., <sup>19</sup>	Chitradurga et al., <sup>21</sup>	MN Khan et al., <sup>11</sup>	Present study
Residual Deviation	0.9%	16%	13%	-	6.7%	3.3%
Synechae	2.6%	6%	0%	4%	6.7%	3.3%
Septal Perforation	3.4%	-	-	0%	0%	3.3%

In our study, the preoperative data between both groups A and B were very comparable as regards age, sex, duration of nasal obstruction, associated symptoms and types of septal deformities indicating that any expected difference between the postoperative results of both groups was not dependant on these factors.

**Summery and conclusion**

To summarise, in our study, out of the 70 operated cases, the difference between endoscopic and traditional septoplasty was found to be significant with respect to residual deviation. In the study by Leena Jain et al., similar statistically significant difference was found on comparison of traditional septoplasty and endoscopic septoplasty.<sup>(19)</sup>

In addition, the incidence of post-operative complications was comparatively less in case of endoscopic septoplasty especially residual deviation which was found to be significantly higher in traditional septoplasty. Thus endoscopic septoplasty may be considered as a better procedure for surgical correction of deviated nasal septum.

Guindi et al., 2016<sup>(22)</sup>, reported that one of the disadvantages of endoscopic septoplasty was loss of binocular vision . In our study the use of the video monitor (video assisted endoscopic septoplasty) enabled us to achieve binocular vision, to present our surgery ,to receive valuable instructions from supervisors , to teach and follow our residents ,to document our work for medicolegal aspects.

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